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10/606,638	06/26/2003	Willi Kreuder	512667-3479.2.	5023

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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 07/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/606,638

Applicant(s)

KREUDER ET AL.

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2005 and 12 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-13 and 16-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-13, 16-24 and 28-30 is/are rejected.
- 7) ☒ Claim(s) 25-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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1. This Office action is in response to applicant's amendment filed March 18, 2005, which amends the specification and provides a replacement abstract, and applicant's amendment filed April 12, 2005, which amends claims 11 and 16-30, and cancels claims 14 and 15. (The amendment to the claims filed March 18, 2005 did not comply with 37 CFR 1.121.) A substitute Declaration was also filed March 18, 2005.

The amendments substantially correspond to a proposed amendment that was discussed with applicant's representative, Howard Lee, via telephone on February 17, 2005. The official amendments contain additional changes to address issues noted by the examiner with respect to the proposed amendment.

Claims 11-13 and 16-30 are pending.

2. The objection to the abstract, as set forth in the Office action mailed October 19, 2004, is partially overcome by applicant's amendment filed March 18, 2005. The examiner notes that the replacement abstract also contains phrases which can be implied: "Described are" and "according to the invention". Phrases which can be implied will be deleted from the abstract by examiner's amendment at such time as the claims are in condition for allowance.

The objection to the disclosure for informalities, as set forth in the October 19th action, is overcome by the March 18th amendment.

The rejection of claims 20, 28 and 29 under 35 U.S.C. 112, 1st paragraph, as set forth in the October 19th action, is overcome by applicant's amendment filed April 12, 2005.

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The rejection of claims 14, 19 and 24-30 under 35 U.S.C. 112, 2nd paragraph, as set forth in the October 19th action, is rendered moot in part by the cancellation of claim 14, and otherwise overcome by applicant's amendment.

The rejection of claims 11-19, 21-27 and 30 under 35 U.S.C. 102 or 103 based on applicant's admission is withdrawn. Prior art has been found showing at least some of the polymers containing structural units of formula (I) that were known prior to 09/30/1994. Rejections are now made based on some of that prior art instead of applicant's admission. If applicant is aware of other prior art disclosing other polymers containing structural units of formula (I), applicant is reminded of the duty to disclose such prior art.

The rejection based on Friend et al. (WO 90/13148) is maintained with modification to address limitations of some of the amended dependent claims, as well as to correct errors in claim numbers referenced in the body of the rejection in the previous Office action. The examiner notes that the amendment to claim 11 does not alter the scope of the claim, and applicant's responses filed March 18, 2005 and April 12, 2005 do not specifically address the prior art rejections (other than to indicate that they are rendered moot by amendment).

3. Claims 16-18 and 20-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

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The last two formulae set forth in claim 16 in the definition of A¹ are not explicitly disclosed in the application as originally filed. Support for polymers of claims 16-18 and 20-22 wherein A¹ as an m-phenylene group substituted with OR' or a p-phenylene group substituted with OR' is not clear.

Support for the subgenus of polymers defined by present claim 20 wherein A² is the second formula shown in claim 20 is also not clear.

Support for the subgenus of polymers defined by present claim 21 is also not clear.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 11-13, 16, 19, 20, 23, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Hosokawa et al. (EP 0 557 534 A1).

Hosokawa et al. disclose copolymers comprising a repeating unit of present formula (I), and teach that the copolymers may be used in an active layer of an organic electroluminescent (EL) device.

While the present claims require more than one structural unit of formula (I), the claim language is open and multiple units of formula (I) may be indirectly connected to each other via units that are not of formula (I). Accordingly, copolymers such as made by Hosokawa's

Synthesis Example 11 (pp. 38-39), Synthesis Examples 24 and 25 (pp. 52-54), Synthesis Examples 27-30 (pp. 55-57), Synthesis Examples 32-35 (pp. 58-61) and Synthesis Example 37 (pp. 61-62) meet the limitations of the electroluminescent material as claimed in present claim 11 and various dependent claims. See page 62, line 33-p. 66, l. 44 for descriptions of EL devices made with some of these copolymers.

Based on the Mw values disclosed in Hosokawa's Synthesis Examples, it is reasonable to expect that the prior art copolymers also meet the limitations of present claim 12.

Of the Synthesis Examples referenced above, all but 30 and 33 provide copolymers that meet the limitations of present claim 13.

The copolymer made by Hosokawa's Synthesis Example 25 is an example of a polymer containing structural units of formula (II) as set forth in present claim 16 and further defined in claims 20 and 23.

The copolymer made by Hosokawa's Synthesis Example 32 is an example of a polymer containing structural units of the formula set forth in present claim 29.

6. Claims 11, 13, 16, 19-21, 23, 28 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Horhold et al. (GB 1345692).

The prior art discloses polymers containing structural units of present formula (I), produced by subjecting an organophosphorus compound of present formula (III) to a condensation reaction with a diketone of present formula (II). See the whole patent. See Examples 1 and 5 in particular.

Note that although the formulae shown in prior art Examples 1 and 5 are slightly different than present formula (I), multiple repeating units of the formulae shown in the prior art examples, bonded directly to each other, provide repeating units containing structural units of present formula (I).

With respect to the present preamble recitation of “electroluminescent”, the only positive limitation of the presently claimed electroluminescent material is a polymer containing structural units of formula (I), which the prior art anticipates, and the only positive limitation of the presently claimed electroluminescent device is a layer of the material, which the prior art also anticipates.

7. Claims 11, 13, 16 and 19-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Horhold et al. (*Journal fuer Praktische Chemie (Leipzig)*), 316(5), 750-760 (1974); see AN 1975:43937 (HCAPLUS).

The German language document is currently not available to the examiner. However, based on AN 1975:43937 (HCAPLUS), the prior art discloses polymers containing structural units of present formula (I).

The polymers represented by each of the eight formulae shown in AN 1975:43937 meet the limitations of a polymer as defined in present claim 11, and further defined in present claim 13.

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Note that although the second and third formulae shown are slightly different than present formula (I), multiple repeating units of either formula, bonded directly to each other, provide repeating units containing structural units of present formula (I).

The polymer represented by the first formula is an example of a polymer that further meets the limitations of present claims 16, 20 and 23.

The polymer represented by the second formula is an example of a polymer that further meets the limitations of present claims 16, 20 and 21.

The polymer represented by the eighth formula is an example of a polymer that further meets the limitations of present claims 16, 20, 22 and 24.

With respect to the present preamble recitation of "electroluminescent", the only positive limitation of the presently claimed electroluminescent material is a polymer containing structural units of formula (I), which the prior art anticipates, and the only positive limitation of the presently claimed electroluminescent device is a layer of the material, which the prior art also anticipates (the abstract indicates that "films" were tested).

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Horhold et al. (GB 1345692) as applied to claims 11, 13, 16, 19-21, 23, 28 and 30 above, or Hoerhold et al. (*Journal fuer Praktische Chemie*) as applied to claims 11, 13, 16 and 19-24 above, and for the further reasons set forth below.

The prior art does not limit the number of structural units in the polymers as required by present claim 12. Absent a showing of criticality for the size of the polymer as limited by claim 12, it is the examiner's position that it would have been within the level of ordinary skill of a worker in the art to make polymers having various degrees of polymerization (i.e. various numbers of repeating units). It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum degrees of polymerization for the prior art polymers to be used according to the prior art, guided by factors such as physical properties associated with polymers of different degrees of polymerization. For example, viscosity generally increases as degree of polymerization increases. Accordingly, one of ordinary skill in the art would have been motivated to provide a polymer having an appropriate viscosity for solution coating if a film of the polymer was intended to be made by solution coating.

10. Claims 11-13, 16-20, 23 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friend et al. (WO 90/13148).

Friend et al. disclose an electroluminescent device comprising a light-emitting layer comprising a film comprising at least one conjugated polymer. See the abstract, the first

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paragraph on page 1, the first full paragraph on p. 3, the two full paragraphs on p. 5, the fourth paragraph on p. 6, pp. 7-9, and page 11, last full paragraph to p. 13, first full paragraph. In particular, see p. 12 where it is disclosed that poly(1,4-phenylene-1-phenylvinylene) can be used to form the film of conjugated polymer.

Poly(1,4-phenylene-1-phenylvinylene) meets the limitations of formula (I) of the present claims wherein A¹ is phenylene, A² is phenyl, and A³ is phenylene, with the exception that the position of the phenyl ring on the second vinylene group shown in formula (I) would be reversed. This prior art polymer meets the limitations of a polymer containing structural units originating from group (II) as defined in claim 16, and further defined in claims 20 and 23, with the exception that the position of the phenyl ring on the second vinylene group shown in formula (II) would be reversed. That is, written in the format used in present claim 11, the prior art polymer contains structural units of the formula $-[A^1-(A^2)C=CH-A^3-C(A^2)=CH]-$. The prior art polymer is a position isomer of the presently claimed polymer and is used for the same purpose as the presently claimed polymer. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make polymers similar to those disclosed in the prior art with the expectation that polymers similar in structure will have similar properties. Compounds which are position isomers are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. *In re Wilder*, 563 F.2d 457, 195 USPQ 426 (CCPA 1977).

The prior art also discloses that conjugated polymers derived from poly(p-phenylene-vinylene) may be used wherein the phenylene ring is replaced by a fused ring system or a

heterocyclic ring system (e.g. see pp. 7-9). Although the prior art does not given any specific examples of a polymer comprising heterocyclic rings and comprising substituted vinylene groups, one of ordinary skill in the art would have been motivated to make polymers similar to those disclosed in the prior art with the expectation that polymers similar in structure will have similar properties. Given the prior art disclosure that polymers comprising heterocyclic ring systems can be used in a light-emitting layer, and that polymers comprising vinylene groups substituted with a phenyl ring can be used in a light-emitting layer, one of ordinary skill in the art would reasonably expect that a polymer comprising heterocyclic ring systems and comprising aryl or heteroaryl substituted vinylene groups could be used in a light-emitting layer. In particular with respect to present claim 18, Friend et al. suggest that the polymer may comprise a thienylene group in place of a phenylene group (e.g. see p. 9).

The prior art does not limit the number of structural units in the polymers as required by present claim 12. Absent a showing of criticality for the size of the polymer as limited by claim 12, it is the examiner's position that it would have been within the level of ordinary skill of a worker in the art to make polymers having various degrees of polymerization (i.e. various numbers of repeating units). It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum degrees of polymerization for the prior art polymers to be used according to the prior art, guided by factors such as physical properties associated with polymers of different degrees of polymerization. For example, viscosity generally increases as degree of polymerization increases. Accordingly, one of

ordinary skill in the art would have been motivated to provide a polymer having an appropriate viscosity for solution coating as set forth in the prior art.

The prior art does not disclose the method of polymerization set forth in present claim 30. The polymerization process of present claim 30 is known (e.g. see the paragraph bridging pages 12 and 13 of the present specification). It would have been within the level of ordinary skill of a worker in the art at the time of the invention to use known methods of polymerization in order to make conjugated polymers similar to those disclosed by the prior art.

11. Miscellaneous:

In line 2 of claim 28, "containg" should read --containing--.

In line 2 of claim 29, "of" should be deleted.

12. Claims 25-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The references made of record and not relied upon is considered pertinent to applicant's disclosure.

The two cited non-patent literature references disclose polymers meeting the limitations of present claims 25 and 27, but neither of these references constitutes prior art.

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14. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
July 11, 2005



**MARIE YAMNITZKY
PRIMARY EXAMINER**

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